Quidnet

Powering the Carbon-Free Electric Future

Modular Geomechanical Pumped Storage

Joe Zhou, CEO | Quidnet Energy

Grid decarbonization requires storage at an immense scale

US POWER MEGATRENDS

260 GW

Retiring dispatchable thermal capacity
Predominantly coal, then petroleum, gas, and nuclear[1]

200 GW

Increase in coincident demand
Driven by electrification of transportation[2]

Increase in supply volatility
PV, wind penetration

Avoidance of new gas turbines
Regulatory, carbon risk

Inadequate long-duration storage solutions battery cost, pumped hydro geography

Order of magnitude: 1 MW ≈ $1M capex

$400+ B

Storage deployment whitespace
(**$7B p.a.** market by 2025[3])

[1] US Energy Information Administration (EIA), Dec 2018
[2] The potential impact of electric vehicles on global energy systems, McKinsey, Aug 2018
[3] Wood Mackenzie Power and Renewables, March 2020

Traditional pumped storage is a proven solution, but faces deployment limitations


NYPA Lewiston Pump-Generating Plant


NYPA Blenheim-Gilboa Pumped Storage Project

94% of the world's energy storage comes from pumped hydro

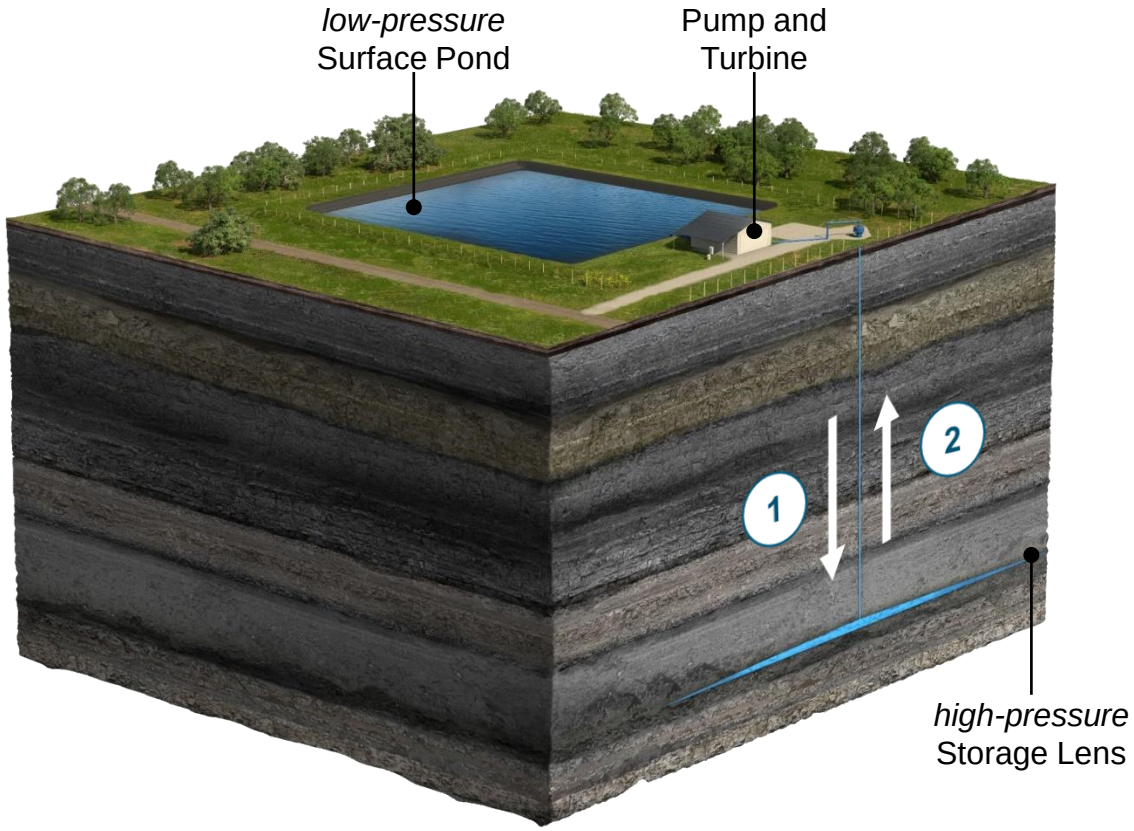
However

Conventional Pumped Storage constrained by:

- Suitable sites
- Lengthy construction time
- Massive scale
- Large capital costs
- Environmental issues

low-cost, long-duration geomechanical pumped storage

Quidnet stores energy as high-pressure water underground



Modular, long-duration storage

1-10 MW per well, 10+ hours

Structural cost position

<50% capex of battery & pumped hydro, <**$10 per** marginal kWh

Broad geological footprint

100+ TWh across multiple US basins

Mature execution supply chain

1. **Charge.** Water pumped down the well into high-pressure storage lens
2. **Discharge.** High-pressure water flows up the well to drive a turbine

A purpose-built leadership team with expertise across power, geomechanics, and capital projects

Joe Zhou, CEO
BD Director at Green Charge (acquired by Engie), ExxonMobil, McKinsey, HBS MBA

Howard Schmidt, CTO / Inventor
Saudi Aramco advanced subsurface intervention, Advanced Energy Consortium, Rice

David Foulon, COO
VP Subsurface, Total US, led geosciences for US shale, team of 70 & $300M development

Scott Wright, Project Manager
10 years drilling and well engineering and operations for independents and private equity-backed E&P

Cliff Mauroner, Geologist
Experienced in international and domestic exploration from Hunt Oil

Bunker Hill,
VP Engineering
Directed engineering and development over 23+ years for Schlumberger's entire Completions portfolio

Mark Zoback,
Geomechanics Advisor
Stanford Professor of Geophysics, Secretary of Energy's committee on shale development & environmental protection

Derek Moretz,
Project Development Expert
Prior Chief Development Officer at Encore, led development of 100+ solar, wind and battery storage projects

Wilson Pulling,
Head of Data Analytics,
Founder of Aatonomy (road-side sensors for AV), Cornell M.Sc. Computer Science

Henry Lau, Project Manager
Drilling, well engineering and field operations, Chevron; P.Eng; BSc Chem. Engineering

Dan Goldman, Project Finance & Development Expert,
Founding Partner CEV & New Energy Capital; VP InterGen; President/CFO GreatPoint Energy

INVESTORS

Breakthrough Energy VENTURES

evok INNOVATIONS

TRAFIGURA

Prime

CEVG CLEAN ENERGY VENTURE GROUP

THE JEREMY & HANNELORE GRANTHAM ENVIRONMENTAL TRUST

Development ramp up across key ISO's, funded by leading investors and government agencies

New York State (NYISO)

~5 TWh estimated
Gen-1 resource

DOE-NYSERDA funded development in upstate to provide grid-scale reliability and network optimization services to support Clean Energy Standard

Texas (ERCOT)

~5 TWh estimated
Gen-1 resource

DOE funded development to provide firming capacity for utility with GW-scale coal and gas plants nearing end-of-life

Ohio (PJM)

10+ TWh estimated
Gen-1 resource

DOE funded development for transitioning power supply mix across Appalachia

Alberta (AESO)

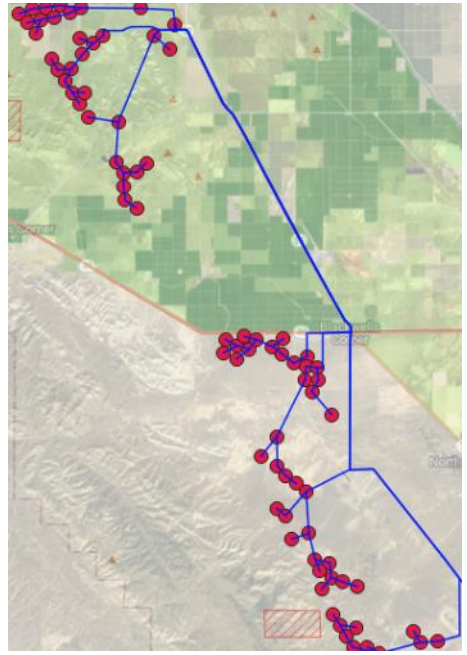
10+ TWh estimated
Gen-1 resource

Emissions Reduction Alberta funded development co-located with renewables to maximize utilization of grid interconnection

California (CAISO)

~2 TWh estimated
Gen-1 resource

Development planning for providing resource adequacy and firming for high solar supply



arpa·e **DAYS program**

EMISSIONS REDUCTION ALBERTA

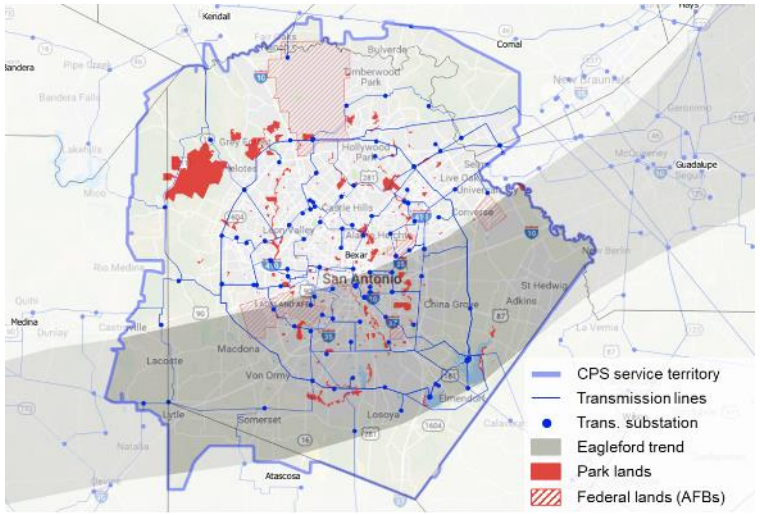
Project deep-dive: Texas

Resource characterization

Generation-1 resource estimate
5 TWh mapped (500 GW at 10 hours)

Peak system load
75-80 GW

Initial basin development focus
Multiple basins (Fort Worth, San Antonio)



Resource development

Exploration well
greenfield drilling

Regulatory engagement

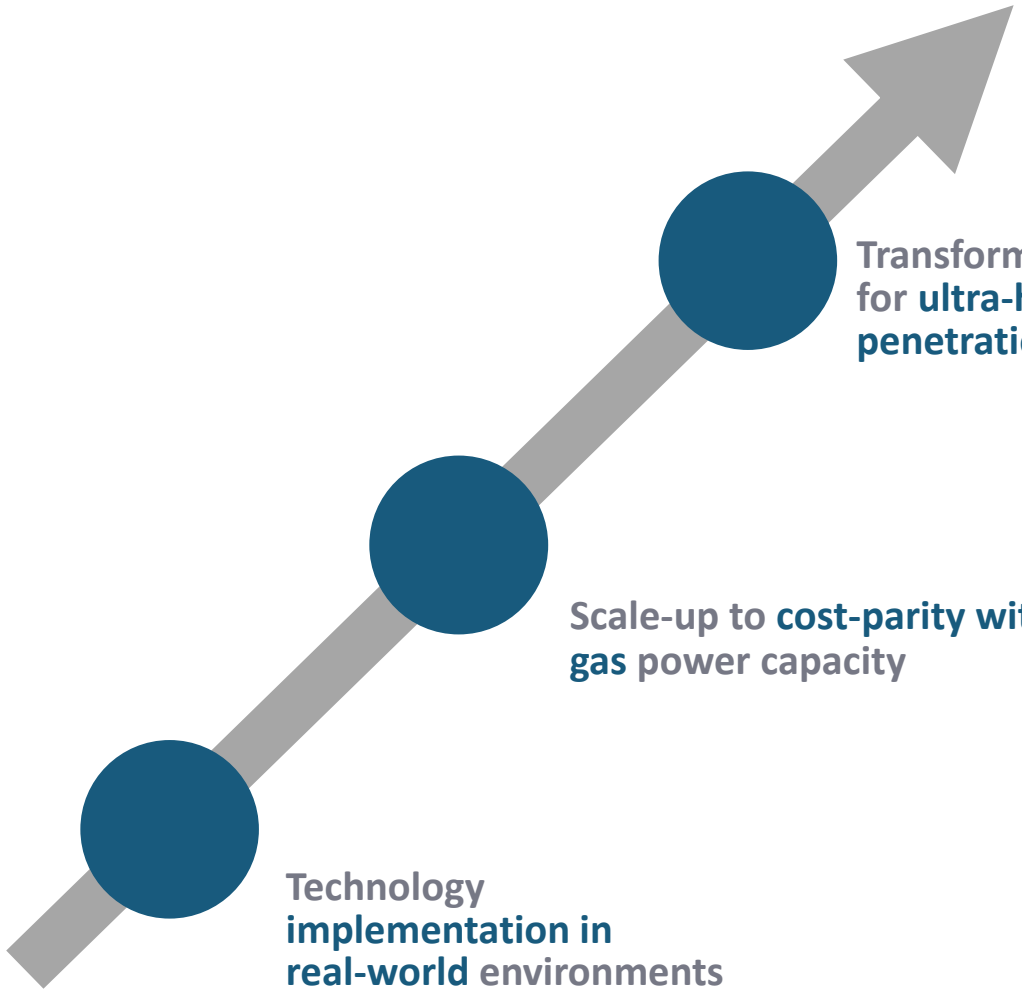
Well permit granted from Texas Railroad Commission, after consultation with regional EPA and Texas Commission on Environmental Quality

Execution support network

Permitting, engineering, drilling, field services, and pumping equipment suppliers

Roadmap to impact at scale

17,500 wells[1] drilled per year at height of US shale; every equivalent 17,500 Quidnet storage wells equals **17-50 GW of storage**



Transform grids at-scale for ultra-high renewable penetration

Scale-up to cost-parity with gas power capacity ●---- ***current focus***

Technology implementation in real-world environments

Scale-up current field performance across multiple regions

Establish multi-basin portfolio of utility-scale GPS projects seeded by ARPA-E DAYS test wells

Establish strategic partnerships for commercial-scaling (origination, EPC, project finance, etc.)

[1] US Energy Information Administration (EIA), number of horizontal wells used as proxy for number of shale wells

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